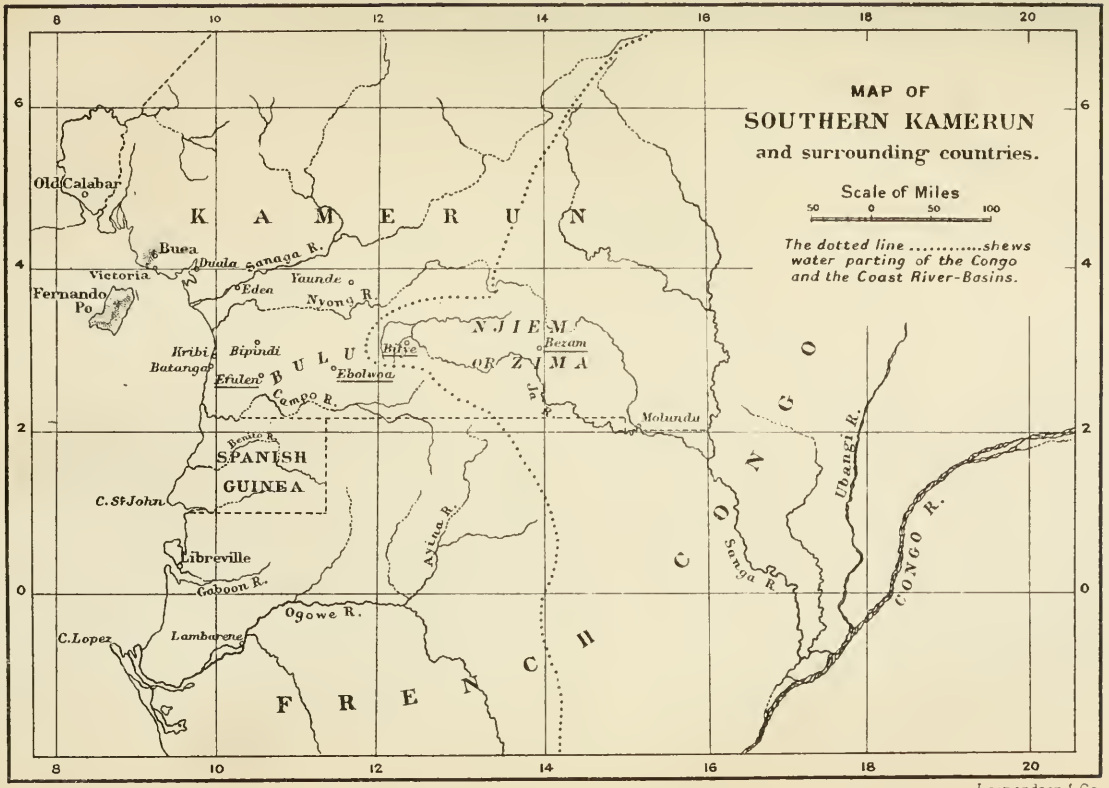
to me, points entirely to an opposite conclusion. The cranium of the Woodcock, when compared with that of the Gannet, for example, has obviously undergone very profound modifications, and these have come about by what may be described as a process of telescoping the basis cranii; thereby the brain-cavity has completely changed its shape, and the aperture of the ear with the rest of the hinder portion of the cranium has been swung downwards and forwards towards the base of the beak, the long axis of which virtually retains its primitive angle. This being so, and the evidence is incontrovertible, it is not the beak which is abnormally situated but the aperture of the ear, as I originally contended. Furthermore, let me repeat once more, the ear of the Woodcock is *not* "just under the eye" as in the Snipe, as was contended by a writer in 'The Field' for Sept. 7, 1907 (vol. 110, p. 479).

XXVII.—*Observations regarding the Breeding-Seasons of the Birds in Southern Kamerun.* By G. L. Bates, C.M.Z.S., M.B.O.U.

(Plate XI.*)

With reference to our northern birds, we are so accustomed to the facts that they nest and breed at a certain time of the year, moult at another, and migrate (in many cases) at a third, that it is hard to realize a state of things in which there is no such regular observance of seasons among birds. On coming to the tropical forest-country of West Africa the ornithologist expects to find breeding- and moulting-seasons among the birds. The assumption that they have such seems to underlie the published accounts of different

* This map has been prepared to shew the localities of the places mentioned by Dr. Bowdler Sharpe and myself in this and former papers on the Birds of Southern Kamerun. See 'Ibis,' 1904, pp. 88, 591; 1905, pp. 89, 461; 1907, p. 416, and 1908, pp. 117, 317. It will be observed that some of the inland places are in the water-basin of the Congo.—G. L. B.



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authors, in which it is said of such and such a bird that it breeds in such and such a month. A conclusion is drawn, for example, from the fact that a bird has been found not breeding in August, and another of the same species breeding in September, that the breeding-season of this species begins in September. With the idea that there must be definite seasons in the life of the birds here, I set out, several years ago, to find out what those seasons were, by keeping a record of the condition of the breeding-organs of the birds which I examined. But when, after a time, I tried to arrange these observations and draw up conclusions, order failed to appear. The more observations I made, the more the confusion increased. When I had details for only a few examples of a certain species recorded, it often looked as if I had found a breeding-season for that species. But further observations nearly always contradicted those previous to them, and it became evident that there was great irregularity in the times of breeding.

Thus I had to give up the hope of establishing definite breeding-seasons for the birds of Kamerun in general. But still it seemed worth while to go on with the record, to see if I could find some groups or species that formed exceptions to the general irregularity, or to ascertain in some birds a preference for one season over another, denoted by a greater number of instances of breeding in that season. And if nothing more were shown, still it would be worth while to establish firmly the fact that the birds of the forests of Southern Kamerun have no distinct breeding-seasons, but that each pair performs its functions in its own time, without reference to others of the species, and without reference to season.

So two or three years ago I began to keep a fuller record than before. I put down in my note-books the condition of the sex-organs not only of the birds skinned, but of many also that were thrown away, including such as were too badly injured for specimens, and such as were brought to me in too great numbers by native boys who caught them with their snares. I recorded also the dates of nests

with eggs or young, and the times at which conspicuous breeding-plumages were seen in such birds as *Pyromelana*. These records I have now tabulated, under the months of the year, for about a hundred species—those for which the greatest number of observations were made. From these tables I have drawn the summaries and conclusions which follow.

Evidences of Breeding.

In drawing conclusions as to the breeding-season from the condition of the sex-organs, it is assumed that in the male the testes are enlarged only at the period of breeding. This enlargement may last during all the courting, nesting, and incubating period, but surely ceases after the brood is reared, unless preparations are made immediately for another brood. In birds of certain families the size of these organs seems to vary little. This is true in the Accipitres, in the Woodpeckers, and in many other Picarian birds. Extremely small testes have been found generally only in birds shewing by their plumage, colour of bill, tender skin and bones, or otherwise, that they were young. In many species in this country (to be noted later) these organs seem never again to become small after maturity is reached. Winter migrants from the north have the sex-organs more reduced than adult resident birds are often found to have.

So, also, in female birds, the condition in which the ovaries are small and thin and hard to see is not often met with except in birds shewing signs of immaturity, and in winter-migrants from the north. Generally there may be seen small ova of various sizes. The growth of the ova must be slow, and they are probably present for a considerable period. The absorption of those which are not fertilized takes place, too, rather slowly, for ova are found in the bodies of sitting females, and even of mother birds after the brood has been hatched out. The most exact indication of the laying period, except the presence of large ova or a full-sized egg, is the enlarged oviduct. The presence of the empty sheaths or sacs of the ova, after

these have ripened and burst out, shews that eggs have recently been laid. If these are carefully counted, the number of eggs laid may be seen. By still other indications a sitting bird may be known. The nearly bare tract of skin on the abdomen becomes completely bare and more or less extended at the sides in a sitting bird, and the innermost layer of the skin next the body becomes swollen and watery.

The Seasons in Southern Kamerun.

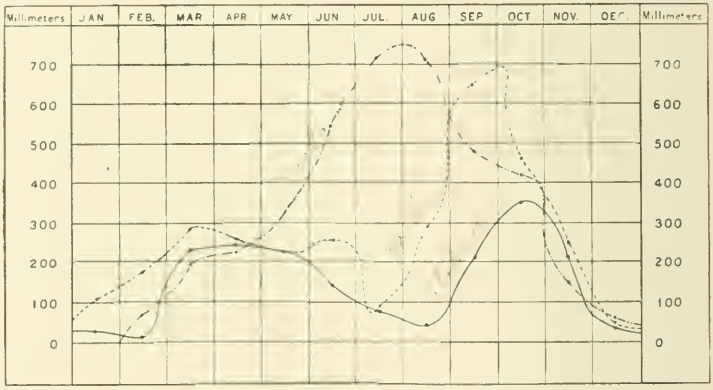
The temperature here may be said, for practical purposes, not to change at all in the different seasons. But there is a good deal of variation in the rainfall in different months. There is a sort of double year, each half of the year having a dry and a rainy season. The rainy seasons come about the equinoxes, when the sun is directly overhead near the equator, and the dry seasons about the solstices. The times when the dry seasons occur correspond, the one to the dry season in Africa south of the equator, which is at its height in July; and the other to the dry season further north, which is at its height in January. These statements apply to the climate of the *southern* part of Kamerun only. Even at Duala, only a little north of Kribi, the southern dry season has disappeared, and the months of July and August have become the rainiest of the year.

I have obtained exact figures for the rainfall in each month at Duala, Kribi, and Ebolwoa, from records kept by officials of the German government (see text-fig. 6, p. 562). At Kribi the rainfall "curve" runs high all through March, April, May, and June; descends in July; but rises again in August, and reaches the highest point of the year in October; and in November descends again, to remain low in December, January, and February. At Ebolwoa it attains its first high point in April, is low all through June, July, and August, and reaches another culmination, the highest of the year, in October.

At Efulen, my general impressions, from several years'

residence there, would lead me to say that the times of the seasons correspond rather to those of Ebolwoa than to those of Kribi—the changes being later than at the coast, and the dry season of July and August being longer. For the seasons at Bitye, where the greater part of my record of the breeding-seasons was made, one cannot go far wrong in

Text-fig. 6.—Diagram of Rainfall in Kamerun, based on the Records of the German Officials.



following the curve of Ebolwoa. At Bitye the later rainy season culminating in October is much the more pronounced and the driest month is February, the dry season often extending well into March.

The rainfall decreases as one leaves the coast. The total for the year at Kribi is 3·14 metres, at Ebolwoa 1·1 metres, and at Bitye it must be still less.

Summaries of Observations on Breeding, for different Groups.

The Doves.—Of *Vinago calva* alone had I a sufficient number of recorded observations to warrant any conclusions; but of it, birds with large sex-organs, or birds sitting on the nest, are recorded for all the four seasons, the two dry and the two rainy ones. Moreover, not only are some

of these Green Pigeons always found breeding, but nearly all individuals that have been examined were breeding.

The Francolins.—The larger Francolin, the Okwal (*Francolinus squamatus*) which lives among the thickets bordering villages and plantations, seems to breed most often in the drier dry season, from December to March. In those months eggs have been found a number of times, and none, as yet, in other months. The Obem (*F. lathami*), on the contrary, which lives in the forest, has been found breeding at all times of the year.

The Cuckoos.—The Common Coucal (*Centropus monachus*) has been found laying or sitting in both dry seasons, but not as yet in a rainy season.

Of the Golden Cuckoos, specimens of *Chrysococcyx cupreus* were found to be breeding in April, June, July, and December, and a young bird not fully fledged was found in March. Of *C. klaasi*, individuals in breeding condition are recorded in January, February, March, June, and a young one in December. A breeding male *Metallococcyx* has been shot in November. The months are here named, in the case of these birds, not only to shew that they breed at all seasons, but also to shew, incidentally, that they are found breeding here in the same months as those in which the same species breed in South Africa.

The Barbets.—Instances of some species of *Gymnobucco* and *Heliobucco* (which are united in one genus by Reichenow) have been found at all seasons, but there seems to be a preference for the dry seasons. Among nine examples of *Heliobucco bonapartei* shown to me from the holes in one dead tree, on the 1st of April, there were young birds of different ages; and an egg was found at the same time. Probably in these colonies some individuals are breeding at all times.

The little Barbets of the genus *Barbatula* seem to prefer the dry seasons for breeding.

The Woodpeckers.—The tiny *Verreauxia*, of which a good many specimens were examined, clearly prefers the dry seasons for breeding. Of ordinary Woodpeckers, breeding-birds have been found at all seasons. These birds are not

such continual breeders as some others, for a large proportion of them, found at all times, were not in the breeding condition.

The Colies.—Many nests of *Colius nigriscapalis* with eggs or young were found, besides the birds killed, of which the breeding-organs were examined. The greater number of the nests with eggs, and also of the breeding-birds, were obtained in the two rainy seasons; and the greatest number of all in the rainiest time, October and November. Yet not all were found at those times: breeding-birds were killed in December and in February, and a nestling was found in August—all dry months.

The Hornbills.—Specimens of the large black Hornbill (*Ceratogymna atrata*) were examined on the two collecting-trips in the great forest near the coast, between Efulen and Kribi: the first in the month of September, which is very rainy there, and the other in July, a dry month. In September, of three birds none were ascertained to be near their breeding-time. In July (with the last days of June), of six birds all had the sex-organs more or less enlarged. This evidence, so far as it goes, points to a preference for the dry season; but in the fragmentary evidence at hand regarding other Hornbills, no such decided preference appears.

The Bee-eaters.—The two species of *Melittophagus* seem to prefer the first (and at the Ja, where the recorded observations were all made, the drier) dry season. Yet eggs of *M. australis* were found also in April, which is moderately rainy.

The Goatsuckers.—All the specimens obtained were breeding; this is partly, no doubt, because most of them had been shot while sitting on their eggs. They breed in the two dry seasons and in the first, or more moderately rainy one.

The Flycatchers.—Of birds of this family a large number of observations are recorded for a good many species. I have written out summaries for several of these species but the results may be told in few words. They shew no particular preference, breeding-birds and young being found

at all times of year. One of the species on which most observations have been made is *Pœdilorhynchus camerunensis*, and it has been found breeding in February, March, April, June, September, October, and December—that is, at all seasons. The apparent preference of *Elminia longicauda* for the month of June has already been noticed in 'The Ibis' (1907, p. 456); but such an exceptional thing as a distinct breeding-season for this species would require a very great number of observations to prove it.

There are no more constant breeders among the birds than the Paradise Flycatchers (*Tchitrea*). The commonest species, *T. viridis*, has been found breeding generally by being caught or shot on the nest, in every month of the year except two; and in both of these two months breeding-birds of one of the other species of *Tchitrea* have been recorded. There is not a single record of an adult *T. viridis* with the breeding-organs small or of an adult male without the long tail-plumes.

The Shrikes.—Of no one species of the Shrike-family is the record complete throughout the year. But I have recorded breeding-specimens or nests of some of the species in every one of the four seasons.

The Starlings.—There are breeding-birds of some of the three species in each of the dry seasons, and none in the rainy seasons; but the observations are not so numerous as in the case of some families.

The Ploceine Weavers.—Birds belonging to the section *Ploceinæ* of the Weaver family (with two exceptions) breed at all seasons. Whenever nests of the Village-Weaver (*Hyphantornis*) have been pulled down and examined, some of them have been found to contain nestlings or eggs. This has been done, according to my records, in seven months of the year and in each of the four seasons. The record of *Heterhyphantes nigricollis* shews breeding-birds or nests with eggs in seven months and at all four seasons. The more scattered records of the other birds of Reichenow's genus *Ploceus*, and of the genus *Malimbus*, shew breeding-birds in both rainy and dry seasons, in both halves of the year. The

exceptions are in the genera *Spermospiza* and *Amblyospiza*. These seem to breed in the half of the year from June to December, and not in the half from December to June, as do the birds which follow.

The Spermestine Weavers.—Examination of the birds of this large group shews a very different result from that obtained in any other group of species, in that all the breeding-birds are found in a distinct half of the year. The males of *Pyromelana flammiceps* assume their gorgeous breeding-plumage in July, and lose it about January; there is no doubt that the species breeds only in the second half of the calendar year. The Widow-bird (*Vidua serena*), which has also conspicuous breeding-plumage, has been seen in this plumage in the same months of the year as *Pyromelana*, though it has not been observed so often. In the little birds belonging to *Spermestes*, *Estrilda* (including *Sporæginthus*), *Pytelia*, and *Nigrita* there is no such change of plumage; for all the examples of these species in a duller plumage that I have seen I take to be immature. Yet all these small *Spermestinæ* have the same breeding-season as *Pyromelana* and *Vidua*; for the large number of specimens which I have examined shew none breeding in the first half of the year, and many in the second half. But in some cases there are breeding-birds in June, in which case we must say that the breeding-season begins early. The genus *Nigrita*, too, shews two or three exceptional instances of breeding-birds in May and January; but these months border on the regular breeding-months. With these exceptions none of the scores of individuals of these Weavers examined were found breeding in the first half of the year. The few specimens of *Pyrenestes* form no exception to the rule. The genera *Amblyospiza* and *Spermospiza* agree with the *Spermestinæ* in respect of the breeding-season.

There is nothing in the changes of seasons in Southern Kamerun that seems to account for the habit these birds have of breeding at a distinct part of the year only.

Perhaps it is a habit brought from another region, as the grass-lands lying to the north.

The Pycnonotidæ.—Of no kinds of birds have more individuals been examined than of *Bleda notata* and *B. syndactyla*, of which numbers—far more than I skinned—were brought to me, caught in snares. But the result of all these examinations was merely this: these species breed at all seasons alike. Many adults are found not breeding, however, shewing that these birds do not breed continually, as some others seem to do.

In the other species of *Bleda*, forming the genus *Phyllastrephus* of the 'Vögel Afrikas,' my record is not so full, but it shews the same result, so far as it goes—breeding-birds at all seasons. The like result is also obtained in *Andropadus* (including *Eurillas*), and here scores of birds were examined in ten months of the year. Of *Pycnonotus gabonensis* breeding-birds, or nests with eggs, are recorded for every month except December, for which no birds, either breeding or not, are recorded.

The Sun-birds.—Of the Sun-birds in general, some individuals are found breeding, and some not breeding, at all seasons. Of the species most fully recorded, *Cyanomitra obscura*, there are breeding-birds for every month except March, when no specimens seem to have been examined; while in October, the rainiest month, no birds had the sex-organs much enlarged. *Cinnyris chloropygia* shews breeding-birds in all the four seasons except the second (and greater) rainy time.

The Warblers.—Of the little Warblers of waste and cultivated ground, *Cisticola erythrops* and *Camaroptera griseiviridis* are most fully recorded. Each of these shews breeding-birds at every season. So do the two species of *Burnesia* and *Hylia prasina*, though the number is not so great.

Of the two species of *Stiphrornis*, of which many individuals were snared in the forest, the combined record shews breeding-birds at all seasons, one filling up the gaps of the other.

The Thrushes.—Turdus saturatus has breeding-birds, or nests with eggs, at all seasons, but with a decided preference for the rainy months. In the drier of the two dry seasons no nests were found, and two out of three birds examined were not breeding. *Neocossyphus poensis* furnishes breeding-birds in every season except the drier dry season, and in this case a good many birds were examined in that season and found not breeding. Exactly the same thing is true of *Cossypha cyanocampter*, and of the two species of *Alethe*. *Callene* shews breeding-birds in all the seasons, and so do the three common species of *Turdinus*. Of all the birds here mentioned under the "Thrushes," except *Turdus* itself, great numbers were caught in snares on the ground, and many observations were recorded.

Seasonal Changes of Plumage and Moulting.

Of no bird that is a resident of Southern Kamerun and breeds there, excepting the two or three already noticed belonging to the Spermestine division of the Weavers, do I know that it has a "winter plumage"—that is, that having once changed from the plumage of the immature bird to that of the adult, it again assumes a plainer plumage, or one resembling that of youth. When the males of *Hyphantornis cucullatus*, to take the most familiar instance, have assumed their bright yellow and black colours, they seem to keep them for the rest of their lives. This is in accordance with the fact already stated, that when adult they always have the breeding-organs large.

I have looked up several facts from my note-books regarding the Sun-birds in particular, which all tend to shew that when the males have once assumed the bright metallic colours, they never lose them again.

(1) Examples of birds changing from the plain to the metallic or velvety plumage have been noted in the cases of *Cinnyris superba*, *C. chloropygia*, and *Chalcomitra angolensis*. But an example has never been noted in which the change is from the metallic or velvety into the plain plumage. I have particularly attended to this point.

(2) Examples of adult male *Chalcomitra angolensis* have been noted which were moulting, and had the old feathers and the new of the same colour, except that the old were dull and bleached-looking. Examples of adult male *Cinnyris chloropygia*, also, are recorded as moulting, but not changing in colour.

(3) Adult males of *Cyanomitra obscura* always have the yellow pectoral tufts. Many examples are recorded of males with the testes small having tufts. They seem never to be lost, but to grow paler when the plumage is old, and to come out brighter after the moult.

There seems to be the same irregularity about times of moulting among the birds of this country as about the times of breeding. Moulting-birds are found at all times of the year. The moult seems to take place, also, without much reference to the breeding-condition of the bird. While doubtless the majority of birds found moulting have the sex-organs small, a very great number of birds of widely different kinds have been noted that were moulting while breeding. But the moult in such cases seems to be gradual, only a few feathers being renewed at one time.

General Conclusions.

Most of the species in Southern Kamerun have no distinct breeding-season. In many, all or nearly all the adult individuals are engaged more or less in the activities of reproduction at all times of the year. In others, some may be found breeding, and some not, at all times.

Certain species—as the Woodpeckers, Barbets, and Starlings—seem to be hindered in breeding by the rains, or for some reason, at least, to prefer the dry season. They seem to be mainly birds which breed in holes in trees.

Other species—as the Colies and the Thrushes and their allies—seem to prefer the rainy season.

But certain Weavers, mainly those of the Spermestine group, have a definite half of the year in which all their breeding is done. Herein they are exceptional among the birds of the country.

Reichenow says, in the introductory pages of the 'Vögel Afrikas' (i. p. xc), "the breeding-time of African birds coincides in general with the rainy season." This is no doubt true of most parts of the Ethiopian Region, where the dry season is more pronounced than in the locality of which I treat. In most parts, as we read in books of travel, the vegetation becomes largely dried up, so that much of the food-supply of the birds is cut off. At such a time breeding would naturally cease. In the shorter and partial dry seasons of Southern Kamerun, however, the forest keeps the ground always moist, and fruits and insects are always to be found.

It is a fact correlated to that of the more or less continuous breeding of the birds here that they seldom lay more than two or three eggs at a time, and that some seem to lay only one at a time. When only two young are hatched in each brood, with all the enemies they have and the risks they run, more broods have to be produced in a year than when four or five are hatched.

There is an interesting correspondence in the life of the plant-world in this country with the irregularity we find in the breeding and moulting times of birds. Many trees and plants flower and fruit more or less at all seasons; many trees shed their leaves continually; and those species which seem to have special fruiting and leafing times do not shew regularity in regard to those times in all individuals.

XXVIII.—*Additional Notes on the True Pheasants* (Phasianus). By Sergius A. Buturlin, F.M.B.O.U.

During the four years since the publication of my paper on the True Pheasants ('Ibis,' 1904, pp. 377–414) several new forms have been described and some important additional material has been examined; moreover, an interesting paper on the subject, by Messrs. S. Alphéraky and V. Bianchi *, has

* "Preliminary Notes on Forms of the Genus *Phasianus* s. str.," in Ann. Mus. Zool. Acad. Imp. St. Pétersb. t. xii. 1907 (actually published in 1908), pp. 425–462.

been published. These much-esteemed and careful writers have properly pointed out some of my errors, and have in certain respects materially improved our knowledge of this difficult group of birds. Though I cannot accept many of their views, it would be out of place to enter into detailed criticism here, as their work is written in Russian, and in the same language I will review it.

Now I will speak shortly about such forms as have been newly described since 1904, or were insufficiently treated in my first paper, and will add a newly-arranged table for the identification of these birds, as my table of 1904 is now out of date.

1. Phasianus tshardjuensis, n. sp. (*Chardjui Pheasant.*)

Phasianus tshardjuensis P. principali proximus, tectricibus alarum albis, pectore juguloque marginibus plumarum purpureo-rubris latissimis (circa 3 mm.), scapularibus aureis marginibus nigris latis (circa 1–2 mm.); interscapulio aureo-flavo, parte anteriore lata prope auchenium purpureo-rubro valde imbuto, marginibus plumarum maculisque triangularibus apicalibus nigris latis cohærentibus, uropygio autem cupreo-purpureo-rubro valde distinguendus.

Hab. prope Tshardjui in Bochara, januario 1905 a dom. Petersen lectus; in Mus. Car. Haraldi V. Loudon in Lisden prope Wolmar, Livonia, conservatus (mares duo ad.).

This short diagnosis is sufficient for the identification of the bird, but it is advisable to give a somewhat fuller description. Head and neck of a rich glossy green with bluish and violet reflections; no external traces of a white collar. Mantle fiery- or orange-golden (brighter than in *P. principalis* and *P. zerafshanicus*), but the uppermost part of the back, near the green parts of the neck, largely suffused with purplish red, just like the chest (in *P. principalis*, *P. zarudnyi*, and *P. zerafshanicus* all the uppermost back is golden, wholly or nearly without purplish-red). Feathers of the upper back with very broad glossy black side-margins and apical wedges, obviously confluent (in *P. principalis* and *à fortiori* in *P. zerafshanicus* these markings are narrower and the side-markings quite—or nearly—interrupted near the end

of the feather, thus not uniting—or very narrowly so—the apical wedges). Scapulars glossy fiery-golden, inner creamy-white and black pattern divided by a narrow U-shaped black line from the golden marginal part of the feathers concealed by overlying feathers; most of them not only spotted apically but also margined broadly—about 1–2 mm.—with glossy black (in *P. zarudnyi*, *P. zerafshanicus*, and *P. gordius* scapulars with no, or quite obsolete, black margins). Rump and upper tail-coverts dark purplish coppery-red (in *P. principalis* and *P. zerafshanicus* rufous brick-red).

Under parts of a light rufescent golden ground-colour (in *P. principalis* and *P. zerafshanicus* paler, nearly golden straw-yellow), flank-feathers tipped with glossy black and some of them with dark purplish red, and sides of the breast with glossy black margins. All the chest- and most of the breast-feathers very broadly margined with purple-red, these margins being about 3 mm. broad on the middle of the chest (in *P. principalis* somewhat narrower, about 2–2½ mm., and in *P. zerafshanicus* very much narrower, about 1 mm., but in *P. gordius* still broader, about 3–4 mm.). Belly rusty brown, edged above by glossy purplish. Lesser and median wing-coverts white.

This description is based on two adult male specimens procured in January 1905 by Mr. Petersen in the Oxus Valley near Chardjui in Middle Bokhara, and now in the possession of my friend Baron Harald V. Loudon in Lisden, near Wolmar. This species evidently inhabits the parts of the middle Oxus Valley higher up the river than *P. zarudnyi* of Khiva and Lower Bokhara, and lower down than *P. gordius*, which is met with in the mountainous parts of Bokhara.

2. Phasianus gordius. (*Karnas Pheasant.*)

P. principalis: 1908, Alphéraky and Bianchi, Ann. Mus. Zool. Ac. St. Pét. xii. p. 440.

This bird, named by Messrs. Alphéraky and Bianchi after the mythical King Gordius, is known from a single adult male specimen shot on the 5th (17th) February, 1899, by Mr. Iljinykh at Karnas, some 50 miles from Karki higher up

the river Oxus, and procured by S. N. Alphéraky through Th. C. Lorenz, of Moscow. It is now deposited in the Academical Museum of St. Petersburg.

The authors give no description, but only a short diagnosis stating that this bird is collarless, has broad (about 3 mm.) purple margins on the chest and no black margins on the scapulars. These characters fit collarless specimens of *P. zarudnyi** as well, but on examining the type specimen I find that it evidently forms a well-marked species of the purplish-breasted group of Pheasants, only resembling *P. tshardjuensis* in the purplish-red colouring of the chest extending to the uppermost part of the back and quite superseding there the golden ground-colour. From *P. tshardjuensis* *P. gordius* differs in having most of the scapulars without any black margins, only with apical spots, and in having the purplish red colouring still more largely developed on the feathers of the upper back, as well as on those of the chest, breast, and sides.

This bird inhabits the Oxus Valley in Upper Bokhara higher up the river than *P. tshardjuensis*, presumably between Karki and Kelif and perhaps somewhat higher up.

* I mean the true *P. zarudnyi* Buturl. (=*P. medius* Zarudn. 1896—not "1906," by the way, as quoted by Messrs Alphéraky and Bianchi—*nec* Milne-Edw. 1870), a bird with *broad* purple feather-margins on the chest and breast. Messrs. Alphéraky and Bianchi's (*l. c.* pp. 430, 436) diagnosis of "*P. zarudnyi*" exactly fits specimens of *P. zerafshanicus* with normal breast-colouring (*narrow* purplish margins and *no* black apical shaft-streaks) and less developed collar; and their diagnosis of *P. zerafshanicus* fits such specimens of this last species that have more developed collar, but are aberrant in the chest- and breast-colouring (having apical black shaft-streaks, an exceptional feature in all this group of Pheasants but sometimes developed in specimens of the Zerafshan bird). Does "*P. zarudnyi*" apud Alphér. and Bianchi mean some undescribed form with narrow chest-margins (as may be presumed from the *habitat* given by them—"Termez" on the Amu-daria in Upper Bokhara, where true *P. zarudnyi* is not likely to occur), or only a synonym of *P. zerafshanicus* (as may also be presumed from the fact that the sportsmen from the Oxus Valley often label their specimens "Amu-daria," though in fact they are procured on Zerafshan, some hours off by rail, *fide* Bar. Har. V. Loudon)? I cannot decide this point now, but their bird is not the bird named "*P. zarudnyi*" by me.

3. Phasianus mongolicus. (*Kirghiz Pheasant.*)

P. mongolicus Brandt, Bull. Ac. Sc. S. Pét. iii. p. 51 (1844).

P. semitorquatus: 1875, Sewertzow, Ibis, 1875, p. 491.

P. mongolicus semitorquatus Buturlin, Ibis, 1904, p. 396.

P. mongolicus mongolicus: 1908, Alphéraky and Bianchi, Ann. Mus. Zool. Ac. St. Pétersb. xii. p. 443.

Messrs. Alphéraky and Bianchi point out that "*P. semitorquatus*" of Dr. Sewertzow is based on a skin of a not quite adult and badly prepared bird, but that other specimens from Dzungaria are in all respects identical with the birds of the Central Tian-shan and of the basins of the Issyk-kul, Balkhash, Ala-kul, and Zaisan-nor, though of course different from *P. turcestanicus* of the Syr-daria basin.

I accept (*tacito consensu*) this view of the latest investigators, until I am able to compare a good series of these birds from different localities.

4. Phasianus süehschanensis. (*Sze-chuan Pheasant.*)

P. süehschanensis: 1906, Bianchi, Bull. Ac. I. Sc. St. Pétersb. v. ser. t. xxiv. n. 1–2, p. 83; 1908, Alphéraky and Bianchi, Ann. Mus. Zool. St. Pet. xii. p. 446.

This species was discovered by M. M. Berezowsky at Sungpan in Süeh-shan, Northern Sze-chuan (Sz'tschwan). A pair (♂, 7/19 May, 1894; ♀, 17/29 June, 1894) is in the Academical Museum of St. Petersburg, while the third specimen, a male, was procured by the Hon. W. Rothschild.

The bird was described and named under the impression that *P. elegans* Ell. presents a scaled appearance of the scapulars, as in *P. decollatus* Swinh. and *P. strauchi* Przev. (and many others), from the inner buffy V- or U-shaped band being externally visible on most of these feathers, whereas in Sungpan specimens the scapulars when in natural position present a uniform general aspect as in *P. vlangalii* Przev. or *P. tarimensis* Pleske. The chest and middle of the breast of this bird is metallic green, as in *P. vlangalii* Przev. and *P. elegans* Ell., and the general colouring rich coppery-chestnut, resembling that of *P. strauchi* Przev. and *P. elegans* Ell.

Now Mr. H. E. Dresser has sent me, with his usual

kindness, an elaborate description (all published descriptions and figures being somewhat contradictory and not quite sufficient) made by him in the British Museum of the type specimen of the *P. elegans* of Elliot (labelled "♂ type. Sechuen, 72. 10. 30. 1, *J. J. Stone*"), and also of Wallis's specimen from the Shan States. Comparing this description with Dr. Bianchi's description of his *P. süehschanensis* and my own notes made from the type of this last species, I see that Mr. Stone's and Mr. Berezovsky's specimens are in fact as similar in the pattern of the scapulars as in other particulars of general coloration. But *P. elegans* has somewhat paler tips to the feathers of the mantle, and, as it seems, no dark apical shaft-streaks at all on the feathers of the upper back. In *P. süehschanensis* these black (metallic-green or blue) wedge-shaped shaft-streaks are, on the contrary, very well developed, being about 10 mm. long and 4 mm. broad in the middle of the inter-scapulary region*. Therefore *P. süehschanensis* Bianchi is quite a good species of Northern Sze-chuan (nearest to *P. vlangalii* of Eastern Tsaidam, but much darker), though its original diagnosis fits *P. elegans* as well.

5. Phasianus strauchi. (*Strauch's Pheasant.*)

P. holdereri: 1901, Schalow, J. f. Orn. 1901, p. 414 (*nec* Buturlin, Ibis, 1904, pp. 384, 406).

Ph. decollatus strauchi: 1908, Alphéraky and Bianchi, *l. c.* p. 447.

Messrs. Alphéraky and Bianchi were able to examine, through the kindness of Dr. A. Reichenow, the type specimen of "*P. holdereri*" of Schalow from Min-Tschou, South-eastern Kan-su, and find that it is quite a typical *P. strauchi*, and that the original description and especially the figure of *P. holdereri* are very misleading. Therefore *P. strauchi* inhabits not only South-western, but all Southern Kan-su. Dr. Schalow was evidently led astray by the presence of

* These black wedges, present in all species of true Pheasants except *P. elegans*, are, of course, mentioned in Dr. Bianchi's very full description, but omitted in the diagnosis and tables.

traces of a white collar, and therefore compared his Min-tschou specimen with what he named "*P. torquatus*." Messrs. Alphéraky and Bianchi quite justly point out that the presence or absence of the collar is a very variable feature in large series of *P. strauchi*, but that white or whitish eyebrows is a more reliable character: it is always quite absent in western forms (*P. vlangalii*, *P. strauchi*, *P. decollatus*, *P. elegans*, &c.), but always present, if only in slight traces, in more eastern forms (*P. satscheuensis*, *P. alpherakyi*, *P. gmelini*, *P. formosanus*, &c.).

In my paper on the Pheasants ('Ibis,' 1904, p. 407) I was led by its description and figure to wrongly identify with "*P. holdereri*" two birds of the St. Petersburg Museum (from Kuku-Khota and from Uliassutai). But these two birds actually belong to *P. kiangsuensis*, as the differences between them (shades of rump-colouring, wing-coverts, and nape) and the North-east Chinese Pheasant seem to be only individual. Besides "*P. torquatus* var. C" of David and Oustalet, which I took to be synonymous with "*P. holdereri*," may be *P. decollatus berezowskii*.

6. Phasianus strauchi sohokhotensis, nov. subsp. (*Kozlov's Pheasant.*)

P. decollatus strauchi: 1906, Bianchi, Bull. Ac. Sc. St. Pét. v. ser. xxiv. t. n. 1 & 2, p. 90 (in Russ.) (pt.: "var. from Soho-choto ad ped. sept. jug. Nan-Schan"); 1908, Alphéraky and Bianchi, l. c. p. 448 (pt.) (nec Przew.).

Phasianus strauchi sohokhotensis *P. strauchi* similis, uropygio olivascente-cyanco plumis filiformibus extimis aurantiacis, superciliis albicantibus nullis, jugulo medio non viridi, parte anteriore interscapulii æneo-rubra, strigis apicalibus triangularibus metallice nigris angustis ornata,—sed lateribus corporis aureo-rufis (vel aureo-ferrugineis), non æneo-rubris, maculis nigris apicalibus angustioribus distinguendus; in oase Soho-Choto ad urbem Tshen-fau in parte meridionali deserti Alaschanici januario 1900 a cl. P. K. Kozlow lectus.

Kozlow's Pheasant differs from typical *P. strauchi* in having paler sides to the body, with the dark apical bands of the feathers of these parts not occupying all the width of

the feathers, and in having a more golden, less coppery sheen on the upper back. Specimens of this bird were procured by Col. P.K. Kozlow, 10–12 (22–24) Jan., 1900—five males and two females—in the southern part of Alashan, in the oasis of Soho-Khoto near Tshen-fan, some 100 kilom. from the *northern* slopes of the Eastern Nan-Shan.

Dr. V. L. Bianchi first pointed out the distinguishing characters of this form, but took it for an individual variety of *P. strauchi.* The following facts, however, prove, as it seems to me, that this bird is a geographical representative of *P. strauchi. P. sohokhotensis* is met with *north* of Nan-Shan, where not a single specimen of typical *P. strauchi* has been procured, though Alashan has been well explored zoologically by Przevalski, Kozlov, and others. On the other hand, south of Nan-Shan, in the valleys of Tatung and Buhuk-gol, on the Amdos Plateau, and in Southern Kan-su, where typical *P. strauchi* abounds and was obtained by Abbé David, Przevalski, Holderer, and Kozlov in very large series, no one has met with *P. sohokhotensis.*

Between the two areas mentioned, on the northern slopes of the Northern Tatung range, intermediate specimens, though much nearer to typical *P. strauchi,* are met with (two males and one female, 10–11 Febr., 1900, Yarlyn-gol, by Col. Kozlov). Therefore I treat Kozlov's Pheasant as only a subspecies or geographical race of *P. strauchi.*

Dr. Bianchi points out (1907, Aves exped. Kozlowi, p. 200) that one specimen from Northern Sze-chuan (Hwo-zsi-gou, north from Lun-ngan-fu, 9 Jan., 1894, procured by M. M Berezowski) is very near to Soho-Khoto specimens. I think that this does not prove *P. sohokhotensis* to be only an individual variety of *P. strauchi,* as in Sze-chuan, as well as in Soho-Khoto, typical *P. strauchi* is evidently not met with *, and Dr. Bianchi himself admits that the range of

* Messrs Bianchi and Berezowski (Aves exped. Potanini, 1891, p. 18) mention *P. strauchi,* one specimen, from the river Hei-ho, at Nan-pin, N. Sze-chuan, July 1885. But Nan-pin is situated near the limits of Kan-su, nearly 50′ north of Lun-ngan-fu, and, moreover, in 1891 these authors did not clearly distinguish between *P. strauchi* and the allied forms. This specimen is not now in the St. Petersburg Museum.

Kozlov's Pheasant may border the range of typical *P. strauchi* in a broad semicircle, from Soho-Khoto in the north-east, through Western Shensi in the east to Northern Sze-chuen in the south-east. But I must add that in his other work (1906, Bull. Acad. St. Petersb, v. ser. xxiv. t. n. 1 & 2, p. 90) Dr. Bianchi quotes this single Hwo-zsi-gou specimen as "*P. berezowskii*" variety of *P. decollatus*, not as a variety of *P. strauchi*, and this identification seems to be the more correct.

7. Phasianus decollatus berezowskyi. (*Berezowsky's Pheasant.*)

P. berezowskyi: 1901, Rothschild, B. O. C. xii. p. 20.

P. decollatus, var.: 1906, Bianchi, Bull. Acad. St. Pet. v. ser. xxiv. t. n. 1 & 2, pp. 83, 90; 1907, Bianchi, Aves exp. Kozlowi, p. 201 (*var. indiv.*).

P. decollatus decollatus: 1908, Alphéraky and Bianchi, l. c. p. 451 (nec Swinh.).

Messrs. Alphéraky and Bianchi, in the work just published, treat *P. berezowskii* as an individual variety of *P. decollatus*, saying shortly that this fact is proved already in Dr. Bianchi's 'Aves expeditionis Kozlowi' (in Russian). In this last-named work Dr. Bianchi states that *P. berezowskii* can be considered only as an individual variety, not a geographical form of *P. decollatus*, as it has no separate range, typical *P. decollatus* being met with not only to the south of the so-called *P. berezowskii*, but also far to the north, in the central parts of the Alashan range.

I must confess that when, in 1906, I looked through the series of collarless Pheasants in the St. Petersburg Museum with Dr. Bianchi, I was rather inclined to share this conclusion from the facts we had before our eyes, and reluctantly to admit a case of dimorphism not known in other species of Pheasants. But the basis of our conclusion, the fact—as we thought then—that *P. decollatus* inhabited the Central Alashan Mts., proved to be our own error. The Alashan bird is, in fact, extremely like typical *P. decollatus* in general appearance and was identified as such in 1906 and 1907 by

Dr. Bianchi, but nevertheless it belongs to quite a different section of the genus, always having white eyebrows, and therefore was named as a new form *P. alaschanicus* by Messrs. Alphéraky and Bianchi themselves (1908, l. c. pp. 434, 452). And it is somewhat startling that these esteemed zoologists wish to retain their conclusions after they have withdrawn as erroneous the only facts on which these conclusions were based.

As a matter of fact, and after examining the Kan-su specimens of M. M. Berezowski in the Irkutsk Museum in 1905, I can state that typical *P. decollatus* is up to now known only from South-eastern Sze-chuan (Chung-king, Swinhoe's specimen), western part of Central Sze-chuan (Ta-tsian-lu, Pratt's specimens), and, it seems, from Western Quei-Chow and North-eastern Yunnan (according to Abbé David). As David and Oustalet did not distinguish between *P. decollatus* and *P. strauchi* (and *P. berezowskii*, of course) and give the figure of *P. strauchi* (Ois. Chin. pl. 100) under the name of *P. decollatus*, their other statements must be rejected. No specimens of *P. decollatus typicus* are known from Northern Sze-chuan or further north. *P. berezowskii*, being, it seems, only a local race—a darker northern race—of *P. decollatus*, was collected by M. M. Berezowski in South-eastern Kan-su (Hui-tsian) and in Northern Sze-chuan (village of Mu-gua-chi in Hwo-tsi-gou Valley, 30 April, 1893, and perhaps, as stated above, another specimen, from another part of Hwo-zsi-gou, 9 Jan., 1894). Some, if not all, Sin-ling and Southern Shensi specimens of "*P. torquatus* var. C" and of "*P. decollatus*" of David and Oustalet must belong to this form.

Therefore *P. berezowskii* and *P. decollatus* are not met with together and are distinct northern and southern forms of one species. But Berezowski's Pheasant lives often side by side with *P. strauchi*, as the latter is common not only in South-western Kan-su, where *P. berezowskii* is not yet known, but in South-eastern Kan-su as well (Min-tschou type of *P. holdereri* of Schalow, and still further east, Hoi-sian or Hui-tsian, just the home of the type specimen of

P. berezowskii). For *P. strauchi* with its paler northern subspecies *P. sohokhotensis* and *P. decollatus* with its darker northern subspecies *P. berezowskii* are quite specifically distinct, and *P. berezowskii* does not form a connecting-link between them, though it is paler than *P. strauchi* and somewhat darker than *P. decollatus*. In the pattern of its side-feathers it is a true "*decollatus*," having them narrowly tipped with black, whereas in *P. strauchi* these black bands occupy the whole width of the feather. And in some respects *P. berezowskii* is even more different from *P. strauchi* than *P. decollatus*. I mean that the black wedge-shaped apical spots on the feathers of the upper back, that are narrow in *P. strauchi* (and *P. sohokhotensis*), are wide in *P. decollatus*, and wider still in *P. berezowskii*. The scapulars in *P. berezowskii* are also somewhat paler than in *P. decollatus*, and not darker. Perhaps it may prove better to treat it even as quite distinct specifically, though the differences from *P. decollatus* are rather those of quantity.

8. Phasianus alaschanicus. (*Alashan Pheasant.*)

P. torquatus: 1891, Berczowski and Bianchi, Aves exp. Potanini, p. 18 (pt., *nec* Gm.).

P. decollatus: Bianchi, 1906, Bull. Ac. Sc. St. Pet. v. ser. xxiv. t. n. 1 & 2, p. 90 ("typicus"!); 1907, Aves exp. Kozlowi, p. 200 ("quite typical") (partim, *nec* Swinhoe).

P. alaschanicus: 1908, Alphéraky and Bianchi, l. c. pp. 434, 452.

A pair of these birds was procured by Col. N. M. Przewalski in January 1884 in an oasis near the western slopes of the central parts of the Alashan Range, in South-eastern Alashan.

P. alaschanicus bears a striking similarity to *P. decollatus* in general appearance, but belongs to quite another section of the genus, having always clearly discernible traces of whitish eyebrows. It has a slight white collar embracing about two-thirds of the neck, but this character does not

always distinguish it from *P. strauchi* and the *P. decollatus* group, as in this last group—as proved by large series of *P. strauchi* in the St. Petersburg Museum—the collar is occasionally just as well developed (though never to such a degree) as in *P. gmelini, P. karpowi,* &c.

9. Phasianus gmelini kiangsuensis. (*North-east Chinese Pheasant.*)

P. holdereri kiangsuensis: 1904, Buturlin, Ibis, pp. 383, 407 (Kalgan spec.).

P. holdereri: 1904, Buturlin, l. c. p. 406 (pt., Kuku-Khota and Uliassutai specimens; nec Schalow, 1901).

P. schensinensis: 1905, Buturlin, Psovaia i Ruzheinaia Okhota, Febr., p. 50 (in Russian) (ex litt.) (Kuku-Khota and Uliassutai spec.).

P. gmelini pewzowi: 1908, Alphéraky and Bianchi, l. c. p. 456 (Kuku-Khota and Kalgan spec.).

When treating the bright-coloured narrow-collared Pheasant of North-eastern China in my previous paper I made several mistakes, as has been justly pointed out by Messrs. Alphéraky and Bianchi.

My first mistake was in tracing the geographical limit between the bright-coloured northern *P. kiangsuensis* and the pale-coloured southern *P. gmelini*. My type specimens of *P. gmelini* came from Foo-chow in Fo-kien, Southern China, and *P. kiangsuensis* was described by me from Kalgan specimens in Northern China (Dr. Radde's specimens were actually examined by me, and Mr. Lorenz's specimens were quite correctly described by him for me *in litt.*). From the wide stretch of country between these localities (about 15°) I had no specimens, and from the description of Shanghai specimens I erroneously admitted them to belong to the bright northern race. But Messrs. Alphéraky and Bianchi were able, through the kindness of Mr. Rothschild and Dr. Hartert, to examine several specimens from Shanghai and Ching-kiang, and found them to belong to the pale southern race—and I concur in this opinion, as I have now examined these birds myself. Therefore the limit between

the two forms lies much more to the north than I assumed, and it is not improbable that all the lowlands of Eastern China (Lower Hoang-ho included) are inhabited by the paler southern race *P. gmelini*. It was, of course, not a happy inspiration to name the bright race *P. kiangsuensis*, as it now proves not to extend its range into the Kiang-su province, but it cannot be helped, and as *Squatarola helvetica* does not breed in Switzerland and *Xylocopus kamtchatkensis* is never met with in Kamtchatka, the error will not remain unique.

My second mistake, as it seems, was in further subdividing the bright-coloured more northern bird into two forms on the ground of characters that do not hold good in a larger series—at least most of them,—as Messrs. Alphéraky and Bianchi point out, and as I am now myself convinced.

My *P. kiangsuensis* was actually based on birds of the north-western mountainous part of the north-eastern provinces of China (Pe-chi-li and Shan-si), which were brought from Kalgan. But brightly coloured specimens of North-eastern Ordos (M. V. Pewzow's specimens: S.W. from Kuku-Khota, near the N.E. bend of the Hoang-ho and Uliassutai) differed, as it seemed to me, in having sandy-grey (not lavender-grey) wing-coverts, a more greenish rump, a more glossy nape, and more dingy superciliaries. I identified these Ordos birds with *P. torquatus* var. C (of David and Oustalet's well-known work) of Shensi, and therefore named them in my letters and manuscript map of Geographical Distribution of true Pheasants "*P. schensinensis*," as mentioned in the Russian edition of my first paper on Pheasants. Later on I identified them with "*P. holdereri*" of Schalow, and described them under that name.

Both these identifications were incorrect, as "*P. torquatus* var. C" is most probably *P. berezowskii* and "*P. holdereri*" is typical *P. strauchi*. Further, the more lavender or more sandy-tinged grey colouring of the wing-coverts as well as the more greenish rump are purely individual features, as may be seen in a large series of almost every species of the eastern group of true Pheasants. The narrowness of the

eyebrows is also to some extent due to abrasion of the feathering. And, lastly, the shades of nape-colouring also seem to present no well-defined line of demarcation.

I may add that in the Ordos specimens of Col. Pewzow—types of my *P. schensinensis* and *P. holdereri*—the chest-feathers are conspicuously, though very narrowly, margined with black, and in Radde's specimen—type of my *P. kiangsuensis* (which I still presume to be of Kalgan origin)—these margins are nearly obsolete. But as other Kalgan specimens examined by myself in Mr. Alphéraky's collection possess these margins, the character seems to be of no value in this form also.

Therefore in this group of Pheasants we must now admit two forms: the more southern *P. gmelini*, having the "mantle and flanks golden-yellow" ('Ibis,' 1904, p. 384) ("coloribus corporis valde pallidioribus," ib. p. 409), and the more northern *P. kiangsuensis* of N.E. Ordos and Kalgan, with the "mantle and flanks golden-orange" ('Ibis,' 1904, p. 384) ("coloribus corporis intensis," ib. p. 408). Messrs. Alphéraky and Bianchi have given to this form a new name "*P. pewzowi*," based on the Ordos specimens of Col. Pewzow, identical, as they admit, with Kalgan birds, and I am very sorry that this much more appropriate name must be rejected on the ground of priority.

10. Phasianus karpowi buturlini. (*Tsushima Pheasant.*)

P. torquatus: 1882, Blakiston and Pryer, Trans. As. Soc. Jap. x. p. 127 (nec Gm.).

P. karpowi buturlini: 1907, Austin H. Clark, Proc. U.S. Nat. Mus. xxxii. p. 468.

This bird is based on a single male specimen obtained on May 21st, 1885, by the late P. L. Jouy, on the island of Tsushima in the Korean Straits. It was compared with a good series (seven males) of true *P. karpowi* from Korea (Corea), and is said to differ in having paler mantle and flanks, broader superciliaries, more greyish rump, more olive and less yellowish central rectrices not so heavily barred toward the tips, and slightly shorter and more arched bill.

Most of these characters, such as the form of the bill and the amount of grey on the rump, and, still more, the amount of barring *on the apical half* of the tail-feathers, are purely individual features in true Pheasants. But the shade of the mantle and flanks and the form of the superciliaries are true diagnostic characters. In these respects *P. buturlini* evidently comes somewhat near *P. ussuriensis*, and it will be advisable to compare carefully the Tsushima bird with specimens from Ussuri-land, and with *P. ymelini* of South-eastern China as well.

This form is *not* known to me *ex autopsiâ*.

I now give a List of the species and subspecies of *Phasianus*, with the dates of the publication of the names and short indications of their ranges, and add a synoptical dichotomous Table for the identification of the adult males. Both in the List and in the Table the sequence of forms is that of their natural affinities, so far as I understand them.

This new table of identification seems desirable, as two forms (*P. semitorquatus* and *P. holdereri*) were excluded from my first list of true Pheasants, and six forms (*P. tshardjuensis, P. gordius, P. süehschanensis, P. sohokhotensis, P. alaschanicus,* and *P. buturlini*) are now added. Moreover, in my previous attempts to diagnose the true Pheasants I did not always use the best and most constant specific characters.

I find it useless to include in my List or in the Table such somewhat aberrant forms of True Pheasants as Reeves's Pheasant of Central Asia and the Japanese Copper Pheasants (*P. sœmmerringi, P. scintillans, P. ijimæ*), as I have nothing to alter in my previous account of them, but only wish to state that my description of the female *P. sœmmerringi* ('Ibis,' 1904, p. 413) was based, it seems to me now, on a wrongly identified specimen of a female *P. versicolor*.

List of the True Blue-and-Green-headed Pheasants.

1. *P. colchicus septentrionalis* Lorenz, 1888. North Caucasus.
2. *P. colchicus typicus* Linn., 1758. Western Transcaucasia.
3. *P. colchicus lorenzi* Buturl., 1904. Kura Basin.

4. *P. talischensis* Lorenz, 1888. S.W. and S. coast of the Caspian Sea.
5. *P. persicus* Severtz., 1875. S.E. Caspian coast.
6. *P. principalis komarowi* Bogdan., 1886. Tejend Basin.
7. *P. principalis typicus* Sclater, 1885. Murghab Basin.
8. *P. principalis zarudnyi* Buturl., 1904. Upper Khiva, Lower Bokhara.
9. *P. tshardjuensis*, n. sp. Oxus Valley near Chardjui, Middle Bokhara.
10. *P. gordius* Alph. et Bianchi, 1908. Oxus Valley near Karnas, Upper Bokhara.
11. *P. zerafshanicus* Tarnovski, 1891. Zerafshan Valley.
12. *P. chrysomelas typicus* Severtz., 1875. Khiva.
13. *P. chrysomelas bianchii* Buturl., 1904. Upper Oxus Basin.
14. *P. shawi* Elliot, 1870. Upper Tarim Basin.
15. *P. mongolicus turcestanicus* Lorenz, 1896. Syr-Daria Basin.
16. *P. mongolicus typicus* Brandt, 1844. From Karatau to the Great Altai.
17. *P. tarimensis* Pleske, 1888. Lower Tarim Basin.
18. *P. vlangalii* Przev., 1876. Eastern Zaidam.
19. *P. süehschanensis* Bianchi, 1906. Northern Sze-chuan.
20. *P. strauchi typicus* Przev., 1876. Amdos Plateau; Southern Kan-su.
21. *P. strauchi sohokhotensis*, subsp. nov. Oasis of Soho-khoto in Southern Alashan.
22. *P. decollatus berezowskii* Rothsch., 1901. Southern Kan-su and Northern Sze-chuan.
23. *P. decollatus typicus* Swinhoe, 1870. Southern and Central Sze-chuan.
24. *P. alaschanicus* Alph. et Bianchi, 1908. Eastern Alashan.
25. *P. satscheuensis* Pleske, 1892. The Oasis Sachjow on the northern slope of the Nan-Shan, in Central Gobi.
26. *P. formosanus* Elliot, 1870. Formosa.
27. *P. gmelini typicus* Buturl., 1904. S.E. China, south to Canton, west to the Ichang Gorges, north to Hoang-ho.
28. *P. gmelini kiangsuensis* Buturl., 1904. N.E. China: Ordos, Kalgan.
29. *P. karpowi typicus* Buturl., 1904. Corea, Southern Manchooria.
30. *P. karpowi buturlini* Clark, 1907. Tsu-shima Isl.
31. *P. alpherakyi ussuriensis* Buturl., 1904. Ussuri-land.
32. *P. alpherakyi typicus* Buturl., 1904. Central and Northern Manchooria.
33. *P. hagenbecki* Rothsch., 1901. Kobdo.
34. *P. elegans* Elliot, 1870. S.W. Sze-chuan, W. Yunnan, N. Shan States.
35. *P. versicolor* Vieill., 1825. Japan (except Yezzo).

Characters of the Adult Males of the Blue-and-Green-headed Pheasants.

I. Middle of the rump and of the upper tail-coverts of a coppery red or rusty orange or buff ground-colour, though sometimes tinged with green or glossed with oily green (dark bars on basal half of tail mostly, not always, very narrow, about 2 mm. —0·1 in.—or less).

A. Scapulars scaled, as on many of these feathers, inner creamy or pale buff pattern variegated with black and divided by a black U-shaped line from the coppery-red or Indian-red margin is plainly visible (never white collared; rump coppery red; chest- and breast-feathers margined with bluish or greenish black).

a. Lesser and median wing-coverts sandy brown; mantle, breast, and flanks darker, more rufescent golden.

a. Chest-feathers only rounded and less emarginated, their black margins much wider than 1 mm. (0·04 inch), even up to 2–2½ mm. (0·1 in.).

a'. Belly blackish brown, always margined above with glossy dark green or blue-green.

a'. Black markings of mantle and breast with greenish gloss; general colouring somewhat paler, more golden red .... *septentrionalis.*

β'. Black markings of mantle and breast with blue or violet gloss prevailing; general colouring somewhat darker, more coppery red ..... *colchicus.*

b'. Belly chocolate-brown (and margined above with glossy coppery red in typical birds of Kura Valley, but with glossy greenish in some birds from Alaschan) .. *lorenzi.*

β. Chest-feathers somewhat more pointed and more deeply emarginated, their black margin narrower than or about 1 mm. (0·04 inch) (belly margined above with glossy coppery red) ..... *talischensis.*

b. Lesser and median wing-coverts buffy white; back, flanks, and breast with more golden-yellow ground-colour (belly edged above

with purple-red; chest-feathers somewhat pointed and deeply emarginated, their black margin narrow, not broader than ½ mm., 0·02 inch) ..... *persicus.*

B. Scapulars, when undisturbed, quite uniformly coloured or variegated only with black apical edges and spots, as wide glossy coppery red or golden margins of these feathers alone are naturally visible, inner creamy or buffish and black pattern being somewhat visible, if at all, on very few of them.

c. Lesser and median wing-coverts more or less white (sometimes greyish or buffish tinged); upper tail-coverts with little if any admixture of green in the copper-red or rusty general colouring.

γ. White collar absent or at least not more than 5 mm. (0·2 inch) wide; mantle largely of a golden ground-colour; middle chest-feathers conspicuously margined with purplish red or with glossy black.

c'. Most feathers of middle breast and chest purple-, not black-margined.

γ'. Uppermost part of back golden yellow, as the rest of the mantle, not or very slightly purplish-glossed.

a''. Scapulars widely margined apically with black (mantle and flanks pale golden yellow; rump brick-red; purplish margins of chest-feathers about 2½ mm., 0·1 inch, wide).

α''. Black markings of mantle and flanks with green gloss prevailing. *komarowi.*

β''. Black markings of mantle and flanks with blue gloss prevailing.. *principalis.*

b''. Scapulars not margined, but only tipped with black.

γ''. Chest-feathers widely margined, about 2½ mm. (0·1 inch), with purple-red; black markings of mantle and flanks with green gloss prevailing; generally only traces of collar present ..... *zarudnyi.*

δ''. Purple-red margins of chest-feathers only about 1 mm. (0·04 inch) wide;

black markings of mantle and flanks with blue gloss prevailing; white collar, though narrow, nearly always uninterrupted behind and on sides of the neck (chest- and breast-feathers sometimes with dark apical shaft-streaks)..... *zerafshanicus.*

δ'. Uppermost part of back differs from the golden parts of the mantle in being strongly suffused with purple-red, as is the chest (purple-red margins of chest-feathers are 3 mm. ($\frac{1}{8}$ inch) or more wide); general colouring intense, fiery- or orange-golden; rump coppery red; collar quite absent or slight traces of it.

c''. Scapulars apically widely margined with black; purplish colouring less developed, margins on middle of chest about 3 mm. (0·11 inch) broad. *tshardjuensis.*

d''. Scapulars with no or nearly no black margins, only tipped black; purplish colouring more developed, margins on middle of chest about $3\frac{1}{2}$ mm. (0·14 inch) broad ..... *gordius.*

d'. Chest- and breast-feathers all margined with glossy black.

ϵ'. Upper back and breast very widely margined with black, so that on the back black about equals the golden ground-colour; long flank-feathers are simply if at all emarginated, and all the end of the feather is occupied by a black spot; dark bars on basal half of middle rectrices narrow, about 2 mm. or less (0·08 inch).

e''. Black margins of chest- and breast-feathers narrower, coppery red on breast prevailing over black (in typical specimens belly blackish brown edged above with glossy green; black markings of mantle and breast with greenish gloss; in some aberrant specimens* belly chocolate-brown edged above with

* Geographical limits not yet ascertained, as most labels are not minute and precise enough. I have seen such specimens from Nukus.

coppery red; black markings of mantle and breast with violet gloss). *chrysomelas.*

f''. Black margins of chest- and breast-feathers wider, black on breast prevailing over coppery red ..... *bianchii.*

ζ'. Upper back- and breast-feathers narrowly margined with black, so that on the back golden ground-colour prevails over black; long flank-feathers are doubly emarginated, so that three apical lobes are produced, central one only (with small adjoining parts of lateral ones) being occupied by a black spot; dark bars on basal half of middle tail-feathers ordinarily (not in all specimens) are wide, about 3–4 mm. (0·12–0·15 inch) ..... *shawi.*

δ. White collar always about 10 mm. (0·4 inch) wide; mantle coppery red or chestnut (with very narrow black apical shaft-streaks or spots); central chest- and breast-feathers with no dark margins or only slight traces of black ones.

η'. Collar complete or slightly interrupted in front; mantle, chest, and dark spots of flanks with bluish and violet gloss prevailing ..... *turcestanicus.*

θ'. Collar more interrupted in front; mantle, chest, and dark spots of flanks with green gloss ..... *mongolicus.*

d. Lesser and median wing-coverts sandy rufous; upper tail-coverts greenish buff (no collar; chest-feathers without or with slight traces of black margins) ..... *tarimensis.*

II. Rump and middle tail-coverts lavender-grey, greenish grey or olive-green without red or rufous tinge, but some hair-like side tail-coverts ordinarily (one species excepted) contrastingly orange or rufous (lesser and median wing-coverts of a lavender-grey or pale sandy-ochreous ground-colour, never whitish or rufous; dark bars on basal half of middle rectrices always broad, about 3–4 mm., 0·12–0·15 inch).

C. Hair-like side tail-coverts with a rusty or orange patch; under parts with more or less whitish, golden yellow, or coppery red.

e. Upper back with obvious glossy black apical shaft-streaks or wedges.

ϵ. Rich green of the neck extending uninterruptedly to the middle of chest and breast; scapulars more or less uniform, as, when undisturbed, on most feathers inner U-shaped creamy or buff and black pattern is covered.

e'. Mantle and sides of breast golden yellow; edges of middle rectrices violet greyish .. *vlangalii*.

f'. Mantle, sides of breast, and edges of middle rectrices with dark coppery red or chestnut largely prevailing ... . *süehschanensis*.

ζ. Rich green of the neck banded in front by the golden or coppery colours of the chest; scapulars scaled as on many of these feathers, inner buff or creamy and black U-shaped pattern is plainly visible and contrasting with maroon, reddish, or rufous margins.

g'. White collar absent, or only traces of it, or else if present it is broadly interrupted, not embracing more than two-thirds of the neck.

λ'. Without any traces of white eyebrow (collar variable).

g''. Upper back with coppery red prevailing over golden yellow, its feathers with narrow black apical wedges; flanks dark with broad black apical bands.

ϵ''. Upper back almost without golden-yellow sheen; sides of breast coppery red with black apical band occupying the whole width of the ends of feathers ..... *strauchi*

ζ''. Upper back with more golden-yellow sheen; sides of breast dark golden rufous, and black apica bands occupy most, but not the whole width of the ends of feathers. *sohokhotensis*.

h''. Upper back with golden yellow far prevailing over coppery red, its feathers with wide black apical wedges; flanks pale with black apical spots occupying only the middle of the ends of the feathers.

η''. Sides of breast golden rufous; black apical wedges of upper back broader; margins of scapulars buffy rufous red ..... *berezowskii.*

θ''. Sides of breast golden yellow; black apical wedges of upper back narrower; margins of scapulars darker rufous red ..... *decollatus.*

μ'. White or whitish eyebrow always present, even in much abraded plumage some traces of it; (collar ordinarily present, though narrow and leaving free the whole front third of the neck).

i''. Margins of scapulars and of tertiaries dark rufous-chestnut strongly contrasting with the fiery golden of the upper back ..... *alaschanicus.*

j''. Margins of scapulars and of tertiaries paler, more sandy brown with some vinous tinge, and passing gradually into the golden yellow of upper back. *satscheuensis.*

h'. White collar present and complete or only slightly interrupted, embracing much more than two-thirds of the neck; white or whitish eyebrow always readily discernible.

ν'. Flanks creamy white ..... *formosanus.*

ξ'. Flanks straw-yellow, or golden, or darker still.

k''. Collar not very broad and somewhat interrupted or at least narrower in front; belly edged in front with glossy green; eyebrows dirty and narrow (narrower than diameter of the eye).

λ''. Mantle and flanks golden yellow .. *ynelini.*

μ''. Mantle and flanks golden orange.. *kiangsuensis.*

l''. Collar very broad, especially in front; belly edged in front with glossy bluish green or violet-green; eyebrows cleaner white and somewhat broader.

ν''. Mantle and flanks golden orange; eyebrow not broader than the eye-diameter; scapulars margined with dark Indian-red or intense rufous-maroon, strongly glossed apically with coppery purplish (no white

post-ocular spot; chest-feathers very narrowly margined, and not to the tip, with black).

ψ. General colouring darker; eyebrows narrower; central tail-feathers more yellowish ..... *karpowi.*

ω. General colouring paler; eyebrows broader; central tail-feathers more olive ..... *buturlini.*

ξ''. Mantle and flanks straw-yellow; eyebrow pure white and much broader than eye-diameter; scapulars margined with light Indian-red or even rufous-buff, and only very slightly glossed apically with coppery purplish.

ϕ. Chest- and breast-feathers with narrow, about $\frac{1}{2}$ mm. (0·02 inch) or less, glossy black margins; black patch under the ear with a white spot; mantle somewhat tinged with golden.

1. Black margins of chest-feathers interrupted near the tip of the feather, not coalescing with the black apical shaft-streak . *ussuriensis.*

2. Black margins of chest-feathers border also their tips, thus coalescing with black apical shaft-streaks ..... *alpherakyi.*

π. Chest- and breast-feathers with broad, about 1 mm. (0·04 inch) glossy black margins; black patch under the ear without white spot; mantle paler, more straw-yellow ..... *hagenbecki.*

f. Upper back without glossy black apical shaft-streaks or wedges (no collar or whitish eyebrow; rich green of the neck extending to the middle of chest and breast; mantle and flanks dark golden orange with coppery-red reflections) ..... *elegans.*

D. Hair-like side tail-coverts without rusty or orange patch; chest, breast, and flanks uniform dark greenish or bluish (no collar nor whitish eyebrow) ..... *versicolor.*